

CMS-822X Series

General Purpose Schottky Mixer / Detector Diodes

Description:

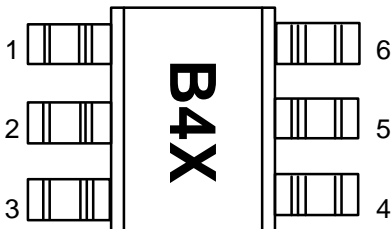
This line of Schottky diodes is specifically designed for both digital and analog applications. Such applications include clamping, mixing, detecting, sampling, and switching. The series includes a wide range of specifications and package configurations which gives the designer flexibility. The CMS-822x series is considered to be the best general all-purpose diode for most applications due to its low forward voltage and good RF characteristics.

At SiliconApps, our commitment to quality components gives our customers a reliable source of RF products. Manufacturing techniques assure that when two diodes are mounted into a single package they are taken from adjacent sites on the wafer.. The various package configurations available provide a low cost solution to a wide variety of design problems.

Features:

- **Low FIT (Failure in Time) Rate***
- **Low Turn-On Voltage (As Low as 0.34 V at 1 mA)**
- **Six-sigma Quality Level**
- **Single, Dual and Quad Variations**
- **Unique Configurations in Surface Mount SOT-23/143 Package**
- **CMS-822K Grounded Center Leads Provide up to 10 dB Higher Isolation**
- **Matched Diodes for Pin to Pin Compatibility**

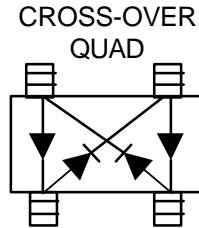
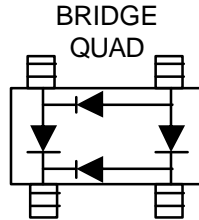
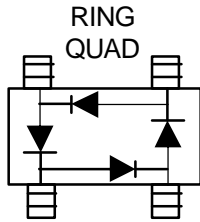
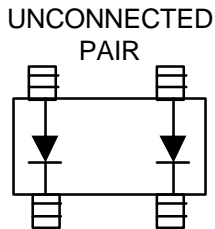
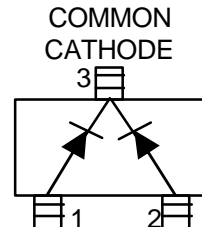
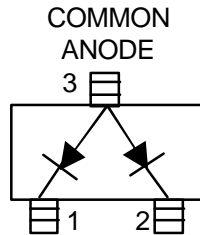
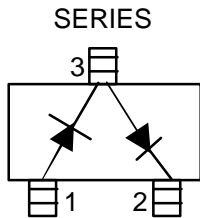
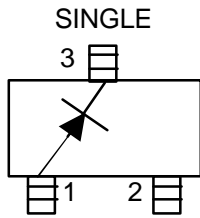
Pin Connections and Package Marking



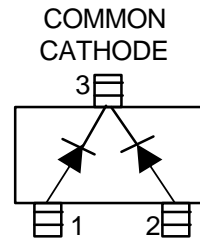
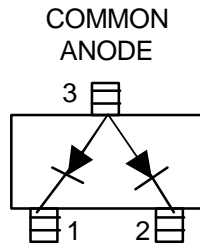
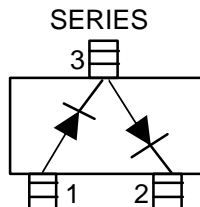
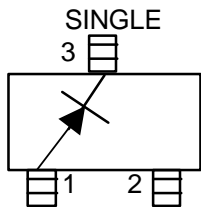
Notes:

1. Package marking provides orientation and identification
2. See "Electrical Specifications" for appropriate package marking

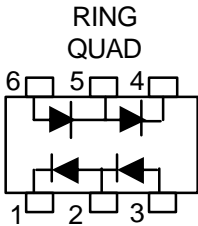
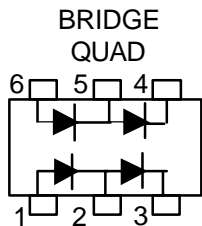
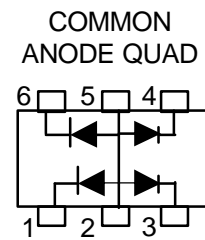
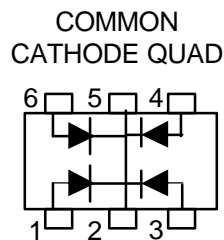
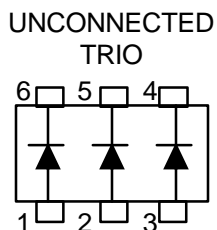
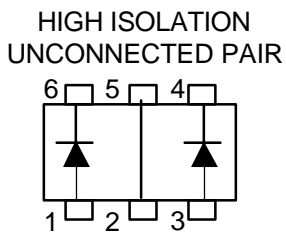
**SOT-23/SOT-143 Package
Lead Code Identification (top view)**



**SOT-323 Package Lead
Code Identification (top view)**



**SOT-363 Package 6 Lead
Code Identification (top view)**

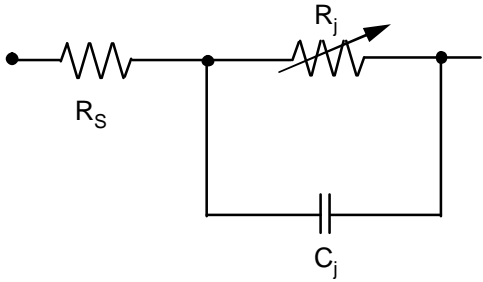


Electrical Specifications, $T_C = +25^\circ\text{C}$, Single Diode

Part Number CMS-	Package Marking Code	Configuration	Minimum Breakdown Voltage V_{BR} (V)	Maximum Forward Voltage V_F (mV)	Maximum Forward Voltage V_F (mV) @ I_F (mA)	Maximum Reverse Leakage I_R (nA) @ V_R (V)	Maximum Capacitance C_T (pF)	Typical Dynamic Resistance R_D (Ohms)						
8220	0	Single	15	340	0.5 10	100 1	1.0	12						
8221	1	Single												
8222	2	Series												
8223	3	Common Anode												
8224	4	Common Cathode												
8225	5	Unconnected Pair												
8226	6	Series												
8227	7	Ring Quad												
8228	8	Bridge Quad												
8229	9	Cross-Over Quad												
822E	E	Common Anode												
822F	F	Common Cathode												
822K	K	High Isolation Unconnected Pair												
822L	L	Unconnected Trio												
822M	M	Common Cathode Quad												
822N	N	Common Anode Quad												
822P	P	Bridge Quad												
822R	R	Ring Quad												
Test Conditions									$I_R=100 \mu\text{A}$	$I_F=1.0 \text{ mA}$			$V_F=0 \text{ V}$ $F=1 \text{ MHz}$	$I_F=5 \text{ mA}$

Equivalent Linear Circuit Model

CMS-822x chip



R_S = series resistance (see Table of SPICE parameters)
 C_J = junction capacitance (see Table of SPICE parameters)
 $R_J = \frac{8.33 \times 10^{-5} nT}{I_b + I_s}$

where

I_b = externally applied bias current in amps
 I_s = saturation current (see table of SPICE parameters)
 T = temperature, °K
 n = ideality factor (see table of SPICE parameters)

SPICE Parameters

Parameter	Units	CMS-822x
B_V	V	15
C_{J0}	pF	0.7
E_G	eV	0.69
I_{BV}	A	1 E-4
I_S	A	2.2 E-8
N		1.08
R_S	Ω	6
$P_B (V_J)$	V	0.65
$P_T (XTI)$		2
M		0.5

Absolute Maximum Ratings, $T_C = +25^\circ\text{C}$, Single Diode

Symbol	Parameter	Unit	Absolute Maximum ^[1]	
			SOT-23/143	SOT-323
P_{IV}	Peak Inverse Voltage	V	15	15
T_J	Junction Temperature	°C	150	150
T_{STG}	Storage Temperature	°C	-65 to 150	-65 to 150
I_F	Forward Current (1μs Pulse)	Amp	1	1
θ_{jc}	Thermal Resistance ^[2]	°C/W	500	150

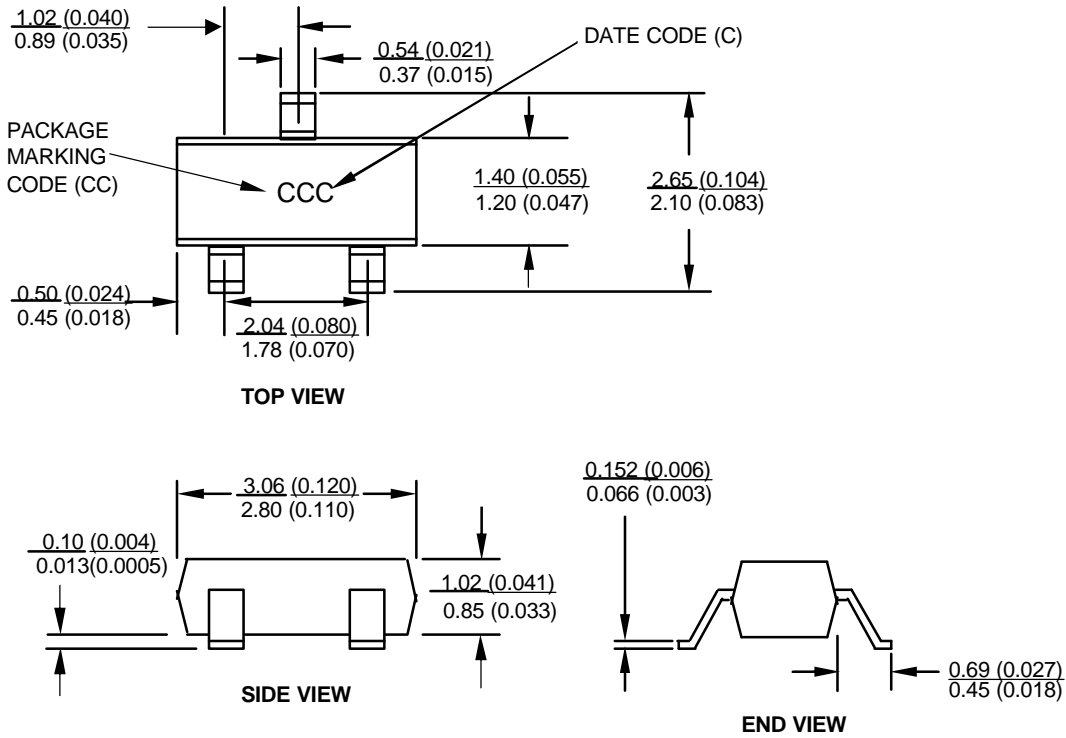
Notes:

- Operation in excess of any one of these conditions may result in permanent damage to the device
- $T_C = +25^\circ\text{C}$, where T_C is defined to be the temperature at the package pins where contact is made to the circuit board.

ESD WARNING: Handling Precautions Should Be Taken To Avoid Static Discharge.

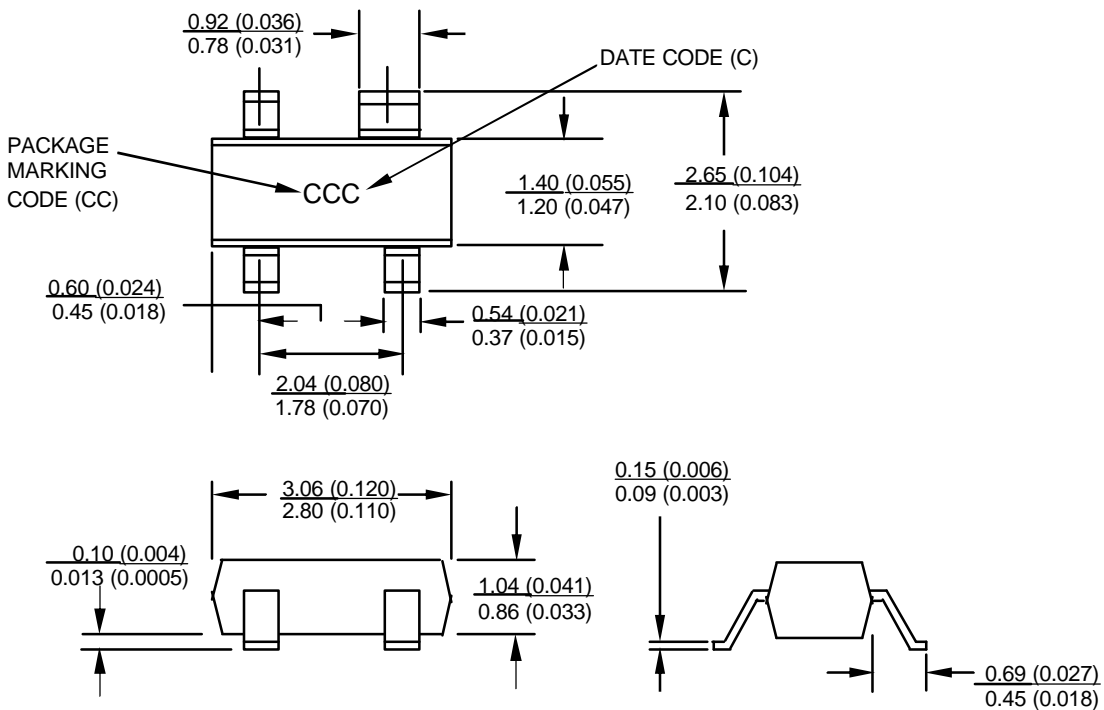
Package Dimensions

Outline 23 (SOT-23)

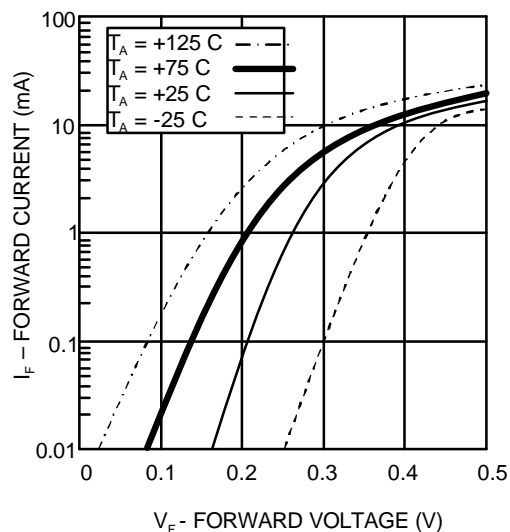


DIMENSIONS ARE IN MILLIMETERS (INCHES)

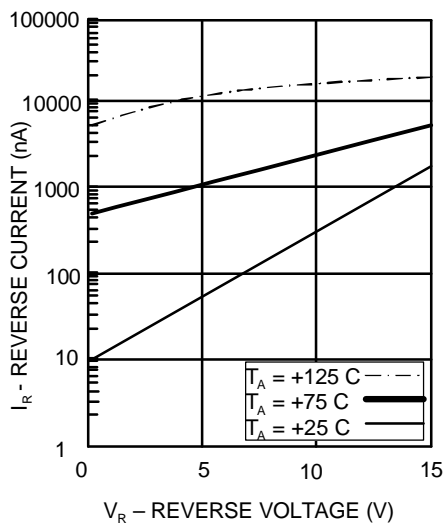
Outline 143 (SOT-143)



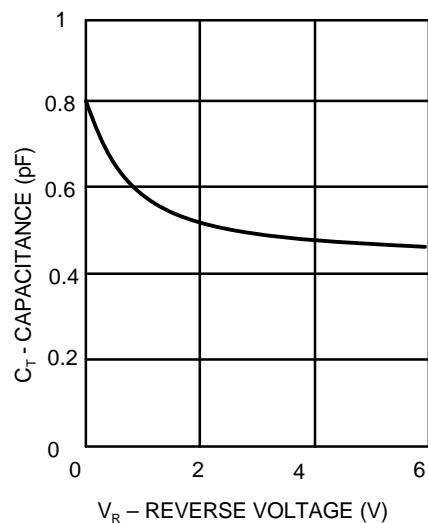
Typical Parameters, Single Diode



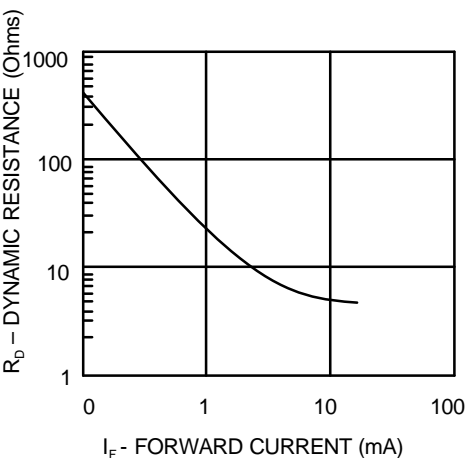
Graph 1: Typical Forward Current vs. Forward Voltage



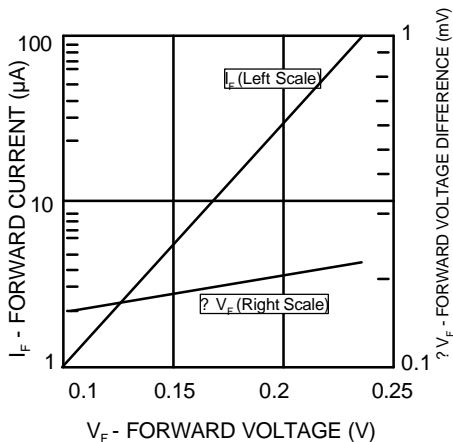
Graph 2: Reverse Current vs. Reverse Voltage at Temperatures



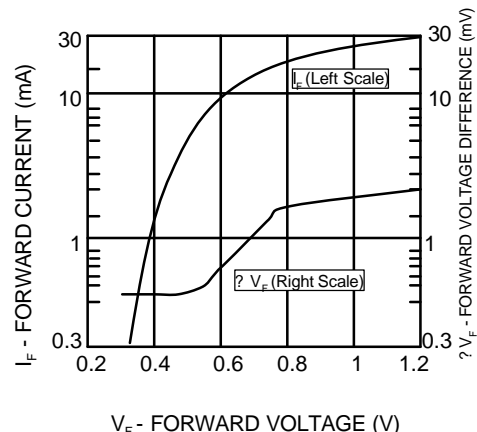
Graph 3: Capacitance vs. Reverse Voltage



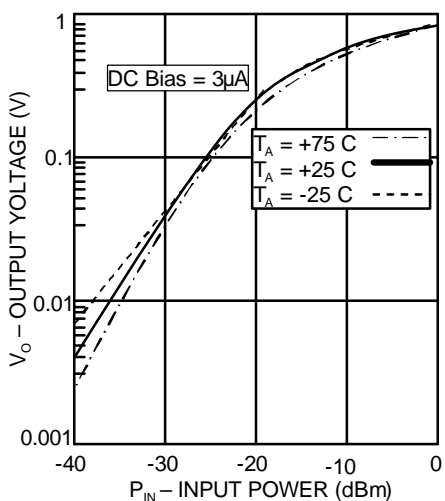
Graph 4: Dynamic Resistance vs. Forward Current



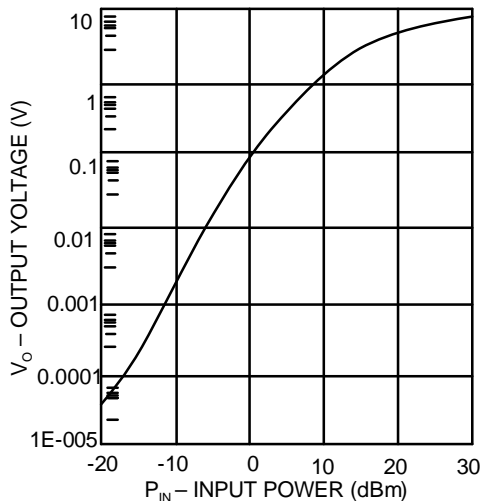
Graph 5: Typical V_F Match, Series pairs at Detector Bias Levels.



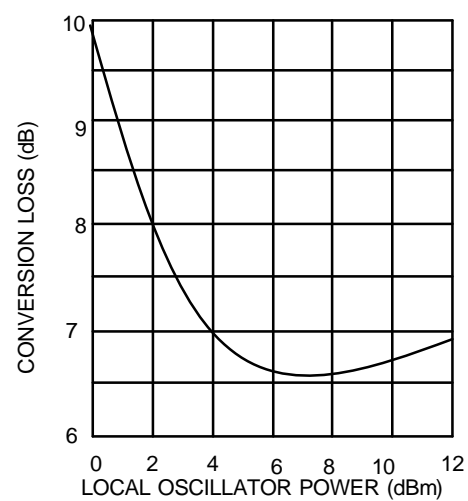
Graph 6: Typical V_F Match, Series pairs and Quad at Mixer Bias Levels.



Graph 7: Typical Output Voltage vs. Input Power, Small Signal Detector Operating at 850 MHz



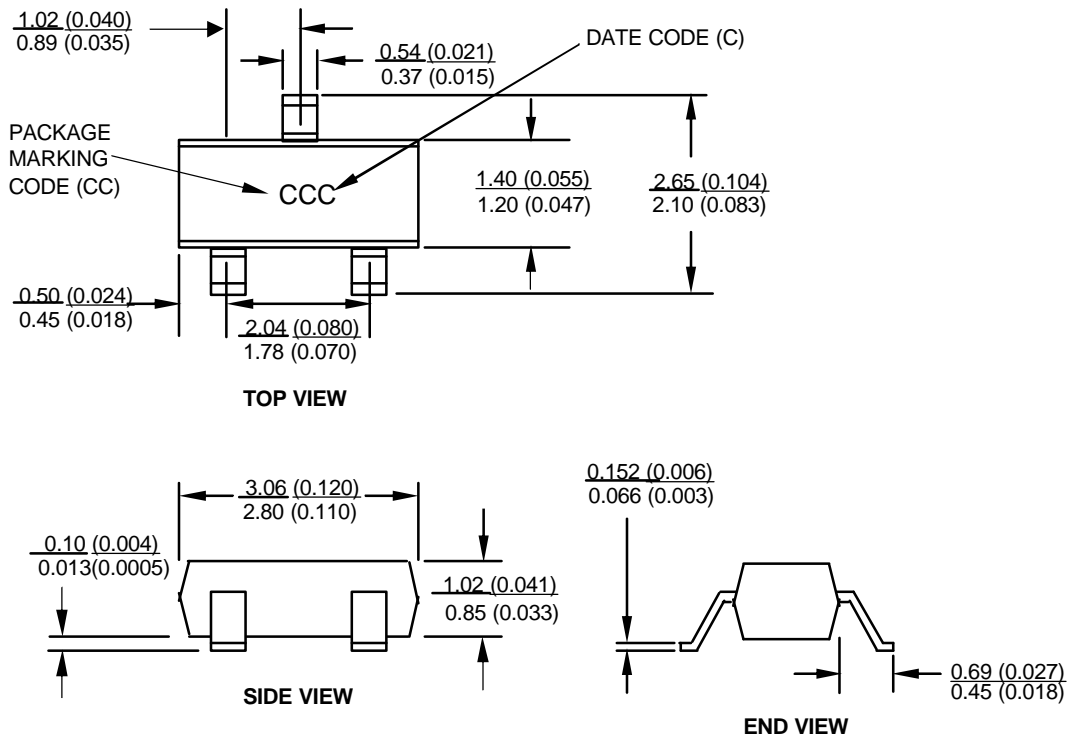
Graph 8: Typical Output Voltage vs. Input Power, Large Signal Detector Operating at 915 MHz



Graph 9: Typical Conversion Loss vs. L.O. Drive, 2.0 GHz

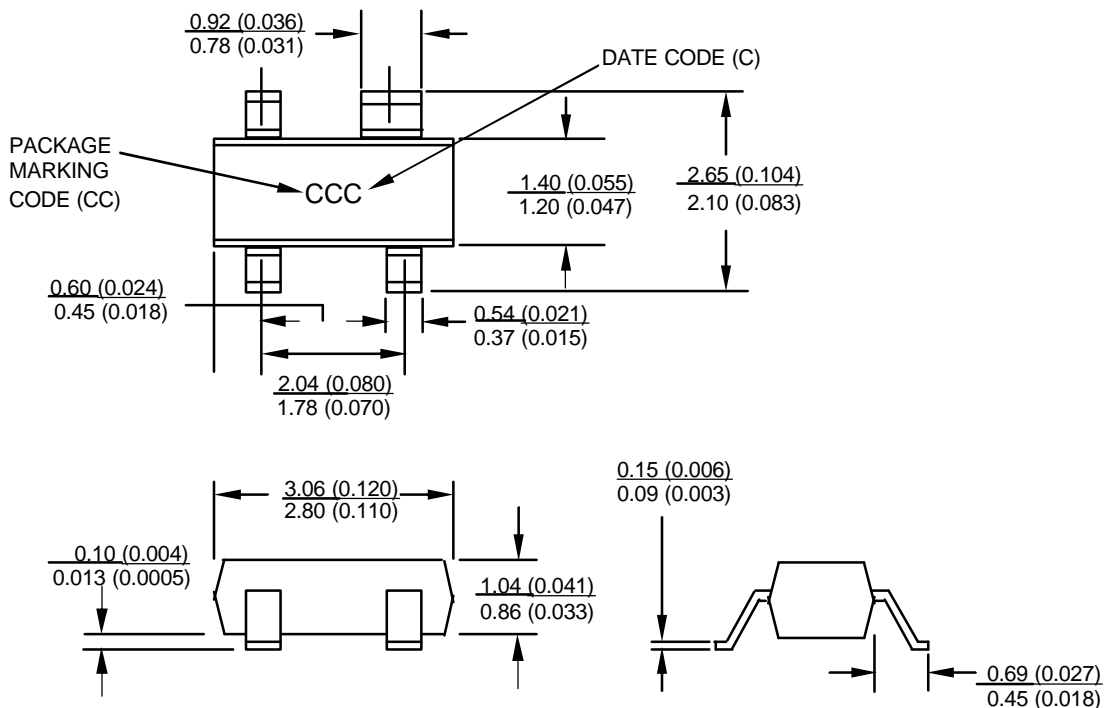
Package Dimensions

Outline 23 (SOT-23)

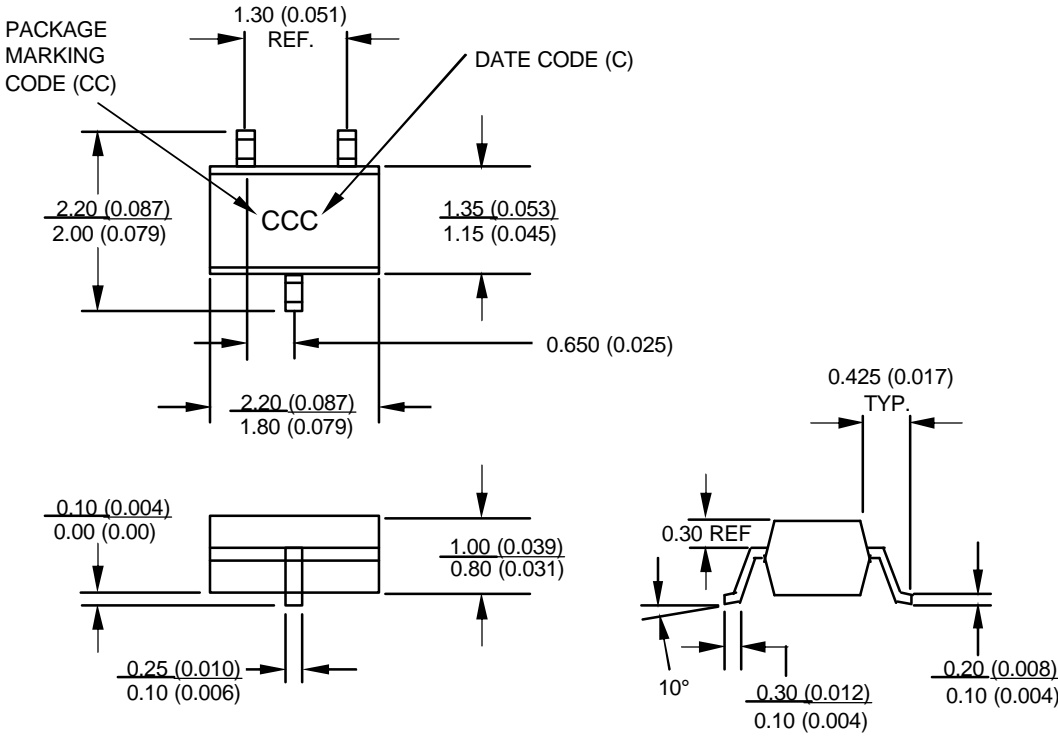


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Outline 143 (SOT-143)

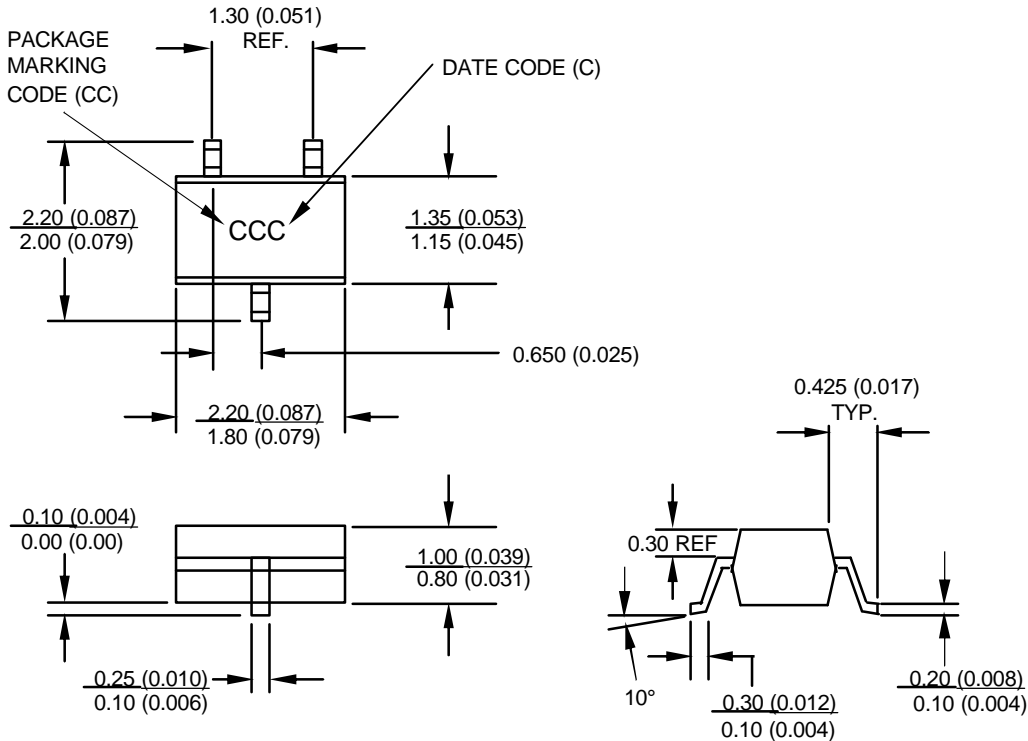


Outline SOT-323 (SC-70)



DIMENSIONS ARE IN MILLIMETERS (INCHES)

Outline SOT-363 (SC70, 6 Lead)



Cross Reference Guide

SiliconApps Part Number	Agilent Part Number
CMS8220	HSMS2820
CMS8221	HSMS282B
CMS8222	HSMS2822
CMS8223	HSMS2823
CMS8224	HSMS2824
CMS8225	HSMS2825
CMS8226	HSMS282C
CMS8227	HSMS2827
CMS8228	HSMS2828
CMS8229	HSMS2829
CMS822E	HSMS282E
CMS822F	HSMS282F
CMS822K	HSMS282K
CMS822L	HSMS282L
CMS822M	HSMS282M
CMS822N	HSMS282N
CMS822P	HSMS282P
CMS822R	HSMS282R

Part Number Ordering Information

PART NUMBER	NO. OF DEVICES	CONTAINER
CMS-822X-TR2	10,000	13" Reel
CMS-822X-TR1	2500	7" Reel
CMS-822X-BLK	100	Antistatic bag

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Revised 05/28/03

Data subject to change

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